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## Injector No. 81713, No. 81713A & No. 81770-1 thru 81770-6

# **Operating Instructions & Service Parts List**



Injector type SL-1, model no. 81770-3

## 1. Foreword

Installation work, setting-up, operation and maintenance of Injectors and the Central Lubrication System shall be executed by qualified, trained personnel.

This User Manual is primarily intended to familiarize the user of Centro-Matic central lubricating equipment with the supplied product 'Injector' and its specifications. It shall also aid to identify parts by part number and parts for service part inventory.

#### 2. Safety Instructions



Warnings for exposure to hazards that may result in serious personal injury if ignored, are marked in the manual by the general safety symbol

Safety Symbol according to DIN 4844-W9

#### CAUTION

Safety instructions that might result in equipment damage and machine malfunction if ignored, are marked by the word 'CAUTION'.

Also heed safety instructions of the manufacturer of the machine!

#### 3. Specifications of the Product

information or service:

Manufacturer LINCOLN St. Louis, Mo 63120-1578 USA

Sales & Service Lincoln GmbH & Co. KG Heinrich-Hertz-Str. 2-8 D-69190 Walldorf / Germany

Contact customer service if requiring additional

 $\Rightarrow$  See bottom line for telephone- and telefax number **Designated Use** 

• Single-line metering device for grease up to class NLGI #2, for use in Centro-Matic single-line lubrication systems.

 Metering device for petroleum based lubricants; if using synthetic lubricants, the subject lubricant must be compatible with the construction parts (steel, FKM seals) of the injector.

• Designed for pressure range of 128-240 bar for operating during lubrication cycle and residual pressure < 41 bar between lubricating intervals in the pause time.

Note: The recommended operating pressure is 173 bar for the lubrication cycle.

Injector SL-1 can be used in a single-line circuit of injectors type SL-11, SL-V, SL-V XL, SL-32 or SL-33 in Centro-Matic central lubrication systems for grease.

Attention: When used together with injectors type SL-32 & SL-33 in a system, the pressure relief must be < 13 bar.



#### Adjusting screw 1

- 2 Indicator stem
- (visual function indicator) 3 Lock nut
- Piston with packing 4
- 5 Spring
- 6 Slide valve piston
- 7 Second outlet, closed. Outlet for control of output, for pre-filling of feed line, also permits application of combined discharge of injectors through one feed line.
- P1 Inlet; grease supply line from pump.
- P2 Outlet: grease feed line to lubrication point.

Stage during pause time

ш Stage on build-up of pressure and lubricating ш Stage after completion of lubricant discharge IV Stage after pressure is relieved



Discharge chamber **b** Measuring chamber а General description

Principal operation of Injector SL-1

Fig. I Pause time. Injector relieved from pressure and spring (5) released. Discharge chamber (a) is filled with lubricant from the previous cycle. Chambers (a) and (b) connected through bores in valve piston (6) and passage.

Fig. II Pressure build-up and lubricating. The central lubrication pump builds up pressure in the lubricant supply line and inlet (P1) of the injector. Valve piston (6) forced to move under the pressure of incoming lubricant and opens the passage leading to the piston, admitting the flow of lubricant to the top of the piston into chamber (b) and forcing piston (4) down as well as causing the retract of indicator stem (2).

Whilst the filling of chamber (b), the piston (4) forces a precharge of lubricant under pressure from the discharge chamber (a) through the outlet port (P2).

Note: The feed line to the lube point is connected either to P2 or to the (plugged) outlet above.

The working pressure (fluid pressure) of the pump must be at least 128 bar for lubricating and shall not exceed 240 bar. The recommended pressure for standard application of Centro-Matic single-line grease systems is 173 bar.



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Fig. III Completion of the lubricating phase. As piston (4) completes its stroke, it pushes the slide valve piston (6) past the passage, cutting off further admission of lubricant to the passage. The discharge from chamber (a) of the preset amount of lubricant to the outlet is completed; piston and slide valve remain in this position until lubricant pressure in the supply line is vented (relieved) at the pump.

Fig. IV Pressure relief. After completion of the lubricating phase, the supply line (lubricant line between pump and injector) must be relieved from pressure. The pressure at injector inlet (P1) must drop below 41 bar. The re-charge with lubricant will be initiated at a pressure of ~ 41 bar, permitting the compressed spring (5) to release. The spring moves the slide valve to closed position. This opens the port from the measuring chamber and permits the lubricant to be transferred from the top of the piston (4) to the discharge chamber (a). After the preset amount of lubricant is shifted from chamber (b) to chamber (a) and the pressure is vented, the injector returns to its normal (rest) position (Fig. I).

Note: Injector SL-1 is a so-called 'direct' single-line metering device. The injector lubricates under pressure applied by the pump to the injector piston (4). The spring of the injector is only for re-charging purposes. Injector output adjustment:

 $\Rightarrow$  See Section 5 'Operation'.

#### **Technical Data**

Injector type	Series SL-1				
Part number	81770 - * Injectors with manifold ) <sup>1</sup>				
	81713 Single unit injector w. thread $)^2$				
	81713A Replacement injector				
Output range	0,131-1,31 cm <sup>3</sup>				
Output adjustment	Setting by adjusting screw, min. to max. = 8 turns) <sup>3</sup>				
Operating	minimum	norma	l	maximum	
pressure) <sup>4</sup>	128 bar	173 bar		240 bar	
	Vent pressure < 41 bar				
Constr. materials	Steel, Seals : FKM				
Amb. temperature	TMIN		TMAX		
(constr. materials)	- 26° C		+ 176° C		
Connections:					
Manifold	2 connections of 3/8" NPTF female				
Injector	Outlet: 1/8" NPTF female				

Note

)<sup>1</sup> Character - \* of part number stands for substitution by number of injectors mounted on manifold:

- 1, - 2, - 3, - 4, - 5, -6.

)<sup>2</sup> Single unit injector not illustrated.

Injector inlet: 3/8" NPTF male.

)<sup>3</sup> Attention: Check output if Adjusting Screw is adjusted to less than 1/2 turn from minimum.

)<sup>4</sup> 'normal' = recommended operating pressure.

During pause time, after completion of the lubrication cycle, a pressure relief below 41 bar must follow.

Also note: When used together with injectors type SL-32 & SL-33 in a system, the pressure relief must be < 13 bar.

Dimensions



Assy. Unit	Manifold	Dim. A	Dim. B		
-1	No. 12658	*	64 mm		
-2	No. 11962	*	76 mm		
-3	No. 11963	32 mm	108 mm		
-4	No. 11964	64 mm	140 mm		
-5	No. 11965	95 mm	171 mm		
-6	No. 246965	127 mm	203 mm		

\* Manifold with 1 mtg. hole

#### 4. Erection & Installation



Warning Never exceed the maximum working pressure of the Centro-Matic system.

Do not carry out any assembly or disassembly works when the system is pressurized or pump/machine are in operation.

Before using synthetic lubricants, check compatibility with the construction materials of injectors and other system components.

## Required tools

CAUTION

Ring & Open end wrenches of inch-size series are required for the installation of injectors.

## Mounting of injectors

The injectors have two outlets; one outlet must be be closed by the fitting supplied with. The outlet for connecting the feed line has a female thread of 1/8" NPTF.

If the lube point (bearing) to be connected requires more than 1,31 cm<sup>3</sup> of lubricant per lube cycle, the outlets of two or more injectors can be externally linked by a connector tube for combined discharge of lubricant; one connector tube is required for each injector connection.

The injector manifolds have a female thread of 3/8" NPTF at both ends

Order connectors separately if required.

The manifolds have mounting holes; see figure above.

Injectors can be mounted in any position.

Mount injector in a position which permits access for output adjustment and visual function control of the injector.

- Location of injectors •
- $\Rightarrow$  See drawing & instructions of the machine manufacturer.
- Allocation of injector/lubricating point
- $\Rightarrow$  See drawing & instructions of the machine manufacturer.



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*Note:* When using feed line tubing of  $1/4^{\circ}$  O. D. (~ 6,4 mm<sup> $\circ$ </sup>), the feed line must not exceed a length of approx. 5 m (based on grease NLGI #1 at 18° C).

Observe on mounting that injector and routing of lines (supply line / feed line) do not interfere with the machine operation. Keep lines clear from damage. Consider max. ambient temperature in case of heat radiation of the machine.

Replacement Injector; pls. note for assembly/disassembly: The injector is fastened with a torque of 61-67,8 Nm to the injector manifold; adhere to torque specification on reassembly of adapter bolt (hex. hd. 7/8"). Have also regard that the adapter gaskets are perfectly seated.

When the injector has been replaced:

- Vent injector and relevant line.
- Adjust lubricant output of the injector.
- $\Rightarrow$  See Section 5. 'Operation'.

## General information concerning the lines for lubricant Piping and fastening material :

 $\Rightarrow$  See drawing & parts list of the machine manufacturer.

As for material quality, resistance to pressure, nominal width and length, the lines used must correspond to the individual operating conditions and must be suitable for the central lubrication system.

Install lines in accordance with good plumbing practice.

Securely tighten connectors to avoid leakage; when installing, follow procedure recommended by the fitting manufacturer.

Tubing and hoses must be clean inside before installing; remove all foreign particles. Steel tubing must be free from rust.

Use tube cutter for cutting steel tubing. Make rectangular cuts and avoid burrs.

Observe manufacturer standards concerning the bending radius of steel tubing & pipes and flexible tubes.

Lines should be securely anchored; use tube clamps to avoid vibration and tearing off of lines.

#### Lubricant feed lines (example)



Legend:

P1 Supply line inlet P2 Outlet

a Outlet 1/8" NPTF

b Outlet 1/8" NPTF

with tube connector

Lubricant Feed Line С Connector tube. combines discharge of two injectors to one feed line.

Outlet of Injector SL-1

## 5. Operation

Never exceed the maximum working pressure of the Centro-Matic system.

Do not carry out any assembly or disassembly works when the system is pressurized or pump/machine are in operation.

Warning

Setting-up for operation

For setting-up of Centro-Matic Central Lubrication Pump and Controller:

- $\Rightarrow$  See User Manual of supplied components.
- $\Rightarrow$  See specific instructions and safety instructions of the manufacturer/supplier of the machine.

## Initial operation



Safety instruction

Wear safety glasses when venting lubricant supply lines. Avoid splashing.

Prior to the initial operation:

 $\Rightarrow$  Read specific instructions as well as safety instructions of the manufacturer/supplier of the machine.

## Filling and venting of the lubricant supply line

Before the injectors may be operated the following steps are necessary:

- Fill main line with lubricant
- Vent branch lines and supply line riser.
- Flush supply line while carrying-out the venting procedure.

Operate pump with low pressure when filling and venting • lines.

· Provide assistant with a can to collect the expelled lubricant when venting the lines.

Check lubricant supply line for any leakage

Please note: The max. working pressure of Injector SL-1 is 240 bar.

#### Output adjustment of injector type SL-1

Legend:

- Adjusting screw
- 2 Indicator stem
- (visual function indicator)
- 3 Lock nut hex. 5/8"

## CAUTION

Adjustment is only permitted when supply line / injectors are depressurized.

Observe lubricant requirement of each lubricating point and the lubricant output setting of the individual injectors:

 $\Rightarrow$  See lubrication chart and instructions of the machine manufacturer.

#### Loosen lock nut (3).

Turn adjusting screw (1) clockwise into injector body to its stop. Use open-end wrench 3/16" (approx. 5 mm).

Then turn adjusting screw (1) counter-clockwise. After 8 full turns of the adjusting screw the injector is set to the max. output of 1,31 cm<sup>3</sup>. If a lower output setting is desired, turn the adjusting screw proportionally.

When the injector has been adjusted for the proper lubricant output, lock adjusting screw (1) with lock nut (3).

Note: Retracting the adjusting screw beyond 8 full turns will not increase the lubricant output beyond the max. output!

When the injector is not under pressure, the indicator stem (2) should contact the crosshead of adjusting screw (1).

Attention: Check output of lubricant directly at the outlet of the injector if the adjusting screw is adjusted to less than 1/2 turn from minimum.

Subject to change

1 n 2

plugged with fitting.



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*Note:* Before operating the machine, for example after installation works or repairs:

• Main supply line / branch lines and injectors must be filled with lubricant and vented.

• Feed lines must be filled with lubricant and connected with lube points.

The function of all injectors must have been checked.

• All injectors and the system control for the lubricating intervals must have been adjusted in compliance with the specifications.

 $\Rightarrow$  See specific instructions of the machine manufacturer.

## Functional check of injectors

The recommended system operating pressure is 173 bar; adjust pump and control system accordingly.

 $\Rightarrow$  See User Manual of the relevant central lubrication pump / control system and injectors.

• Initiate manual starting of the lubricating cycle.

After the rising of the pressure to ~ 128 bar the indicator stem of the injector must be retracted; after pressure relief < 41 bar the indicator stem must return, back to rest position. Insufficient venting of the supply line system may impair the function of injectors.

*Note:* When used together with injectors type SL-32 & SL-33 in a system, the pressure relief must be < 13 bar.

When all injectors of the system have been checked and function properly:

Fill feed lines with lubricant.

Before connecting the feed lines to the lubricating points:

• Fill feed lines with lubricant.

Use only lubricant specified by the machine manufacturer for pre-filling.

- Fill lines with lubricant by means of a grease gun.

The feed line can be filled via the alternate outlet port in the injector body.

Check feed line outlet for evidence of lubricant flow.

Collect emerging lubricant at the end of the line.

When all lines have been filled:

Connect feed lines.

## **Operation**

During operation of the central lubrication system

- all injectors must have been set to the lubricant output specified by the machine manufacturer.

 the lubrication system controller must have been set to pause time as specified by the machine manufacturer.

- the required operating pressure (fluid pressure) for operating the injectors (lubricant discharge) as well as the subsequent pressure relief of the lubricant supply line for re-charge of the injectors have to be observed.

When the machine is put out of operation

the central lubrication system must be switched off.

## CAUTION

Excess lubrication or insufficient lubrication may result in machine damages.

Do not use contaminated lubricants.

#### Warning



Never exceed the admissible working pressure of the central lubrication system.

Switch off pump immediately in case of defects or abnormal operating performance.

When putting machine and central lubrication system in operation after a longer shut-off period:

- Check function of the central lubrication system.

Inspection and maintenance



Warning Never attempt to disassemble the equipment while

pump is in operation or system is pressurized. Do not perform adjustment of injectors while the

system is pressurized.

Check all lubricant lines and injectors regularly for leakproof and proper condition.

- Check function of the central lubrication equipment (pump/controller/injectors) regularly.

• Eliminate defects immediately.

<u>Maintenance</u>

## Warning



Never attempt to disassemble the equipment while pump is in operation or system is pressurized.

Before performing any works the machine must be out of operation.

Heed safety instructions of the machine manufacturer.

If machine components being also part of the central lubrication system were removed for service, they shall be properly reassembled before the machine is operated again. Then check the function of the centralized lubrication system as specified. The same applies to maintenance work performed on parts of the *Centro-Matic* central lubrication system.

Avoid contamination of the indicator stem in order to prevent premature wear of the injector seal. If necessary, provide protective injector cover cap;

No. 83272 Cover Cap, Vinyl plastic material.

Trouble shooting

- $\Rightarrow$  See User Manual of the relevant central lubrication pump.
- ⇒ See User Manual of the relevant system control & monitoring equipment and instructions of the manufacturer of the machine.

## CAUTION

Operation of the machine with inactive or defective central lubrication system will cause damages to the machine.

 $\Rightarrow$  See instructions of the machine manufacturer.

Malfunction of individual lubricant metering devices or damaged lubricant feed lines will cause damage of parts connected to because of lack of lubrication.

## 6. Repair

Repairs must be carried out by qualified, trained personnel only.

## Warning



Do not disassemble injectors when pump/central lubrication system are pressurized.

Before performing any works the machine must be out of operation.

Before servicing shut off pump/central lubrication system and perform pressure relief procedure. Depressurize pump and supply line system.

Always collect lubricant in a can.

After repair of injectors:

Check function of injectors.

Replacement Injector no. 81713A recommended for service parts inventory. Permits change of injector without remove of the injector manifold.

After repair, before restart of normal operation of the machine/central lubrication system:

- Adjust output of the relevant injectors as described.

Vent lubrication line system and check function of the central lubrication system.



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Attention: Adhere to torque specifications on re-assembly					<i>Note:</i> Single Unit Injector no. 81713 ref. to left figure.		
Item	3	Piston stop plug	torqu	e 34-40,5	Nm	Replacement Injector no. 81713A for use on manifold	
Item	19	Adapter bolt	torqu	e 61-67,8	8 Nm	consists of item 1 thru 19	
Item	20	Adapter	torqu	e 61-67,8	8 Nm	Item # Manifold ref. to chart	
MANIFOLDS Item #					© = change - Note -		
No.	126	58 1-unit	No.	11964	4-unit	The thickness of Lock Nut item 2) has been increased	
No.	119	62 2-unit	No.	11965	5-unit	from 3,8 mm to 7,6 mm. Therefore the maximum output	
No.	119	63 3-unit	No. 2	46965	6-unit	setting by item 1) changed to 8 turns (was 12 turns).	
						-	

Service parts list

Injector SL-1, Ser. H,

H, no. 81713A and no. 81770 - \*\*

Item	Description	@	Qty.	Part no.	Item	Description	@	Qty.	Part no.
1	ADJUSTING SCREW		1	11623	15	15 PACKING, FKM		1	-
2	LOCK NUT (hex. 5/8")		1	11624	16	WASHER	•	1	-
3	PISTON STOP PLUG		1	11450	17	GASKET		1	31064
4	GASKET	•	2	-	18	PACKING, FKM	<b>♦</b>	1	-
5	WASHER	•	1	-	19	ADAPTER BOLT (hex. 7/8")		1	11961
6	O-RING, FKM	• •	1	-					
7	INJECTOR BODY ASSY.		1	241427					
8	PISTON w. indicator stem	•	1	-	20	ADAPTER		1	13216
9	FITTING ASSY.		1	90471		used on injector no. 81713			
10	PLUNGER SPRING	•	1	-					
11	SPRING SEAT	•	1	-	#	MANIFOLD			see chart
12	PLUNGER	•	1	-		with 2 inlet connections of 3/8	" NPTF	<sup>;</sup> fema	le
13	PACKING, FKM	• •	1	-	colum	n @: • Item included in no.	2501	58 Re	epair Kit
14	INLET DISC	•	1	-	columr	n @: 🔹 🔶 Item included in no.	2460	00 Sc	oft Parts Kit